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# SURFACE AREA DETERMINATIONS OF FIVE SALT SAMPLES

by

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## INTRODUCTION

Dr. T.E. Peel, Domtar Inc./Research Centre, requested assistance from CANMET in seeking a solution to a problem of salt (NaCl) caking at one of the company's production units. The problem was postulated to be a function of excessive adsorbed moisture resulting from above normal surface area: scanning electron microscopy had revealed a bimodal particle size distribution in the affected materials, with fine grained crystallites apparently nucleated on the surfaces of the normal sized crystals. Hence, Dr. Peel requested that CANMET determine specific surface areas of five samples, using the Quantisorb QS-10 instrument. The work was performed under Project 3.0.2.9.99, Cost Recovery Job No. 025261, in response to Domtar Inc. Purchase Order 1101-3537.

## PROCEDURE AND RESULTS

The samples are designated in this report according to the identification numbers assigned by Domtar. They had been prepared by Domtar by screening to 35 to 48 Tyler mesh and oven-drying overnight at 105°C, following which they were placed in tightly sealed containers for forwarding to CANMET. They remained sealed until the time of measurement.

Standard measurement procedures were followed, according to the instructions of the instrument manufacturer: in light of the low anticipated specific surface areas, care was taken to ensure that the cell was completely filled (2 to 3 g of material) to avoid separation of the gases. Nonetheless, the volume of gas required for calibration was the minimum measureable with the syringe provided with the equipment, indicating operation at the extreme limit of measurement and precision of ± 5%. The measured values were:

| Sample No. | Calculated Specific Surface ($m^2/g$) |
|---|---|
| 1 | 0.23 |
| 2 | 0.33 |
| 3 | 0.16 |
| 4 | 0.53 |
| 5 | 0.25 |

## DISCUSSION

Abnormal desorption peaks were observed for all samples: a preliminary peak similar to adsorption was obtained for all samples. Discussion with the instrument manufacturer confirmed this was probably a function of gas separation: they recommended use of Krypton as the adsorbed gas at such low specific surfaces. This information was communicated to Dr. Peel, who elected to attempt measurement of the surface areas by other means available to Domtar.